MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2021/2022

PMT0101 – MATHEMATICS I

(All sections)

3 OCTOBER 2022
9:00 am – 11:00 am
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 3 pages with 5 Questions only.

2. Answer **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

QUESTION 1 [10 marks]

a) Simplify the expression and write your final expression in term of positive exponents.

$$27^n - \frac{243^{n-1}}{9^n} \times 81$$ [3 marks]

b) Rationalize the denominator for $\frac{4}{2\sqrt{3}-5\sqrt{2}}$ and simplify. [2 marks]

c) Simplify the following expression completely.

$$\frac{m-2}{6m^2+12mn} \times \frac{m^2-4n^2}{4m-8}$$ [2 marks]

d) Evaluate $\frac{7+4i}{2-5i}$ in the form of complex number $a+bi$, where a and b are real numbers. [3 marks]

QUESTION 2 [10 marks]

a) Solve $\sqrt{5x+9} = x-1$ for x and verify your answer. [3 marks]

b) Solve the given inequality and write your final answer in interval notation. [7 marks]

i. $(3-x)^2 \geq 49$

ii. $-x+3 \leq \frac{x}{5} - 2 < 5+3x$

Continued .....

QUESTION 3 [10 marks]

a) Find the equation of a straight line which passes through $(2,1)$ and is perpendicular to the line $2y + 3x - 2 = 0$. [2 marks]

b) Point $Z(2,0)$ lies on the straight line between point $A(-4,3)$ and $B(x,y)$ such that $AZ:ZB = 3:2$. Find the coordinate of point B. [3 marks]

c) Given endpoints of a circle $(-2,3)$ and $(4,1)$. [3 marks]

i. Find the center and radius of the circle.

ii. Based on the given endpoints, find the standard equation of the circle.

d) Prove that $f(x) = x^5 + 2x^3$ is an odd function. [2 marks]

QUESTION 4 [10 marks]

a) Given $g(x) = \frac{1}{x} + 2$ and $h(x) = \sqrt{3x+6}$ [5 marks]

i. State the domain of $g(x)$ and $h(x)$ in interval notation.

ii. Find $h^{-1}(x)$.

iii. Find $(g \circ h^{-1})(2)$.

b) Given $log_2(x-1) = log_4(x+5)$. Solve for x. [3 marks]

c) Solve the equation $log_7(3x^2 + 1) = 2$ [2 marks]

Continued .....

QUESTION 5 [10 marks]

a) Given a quadratic function $f(x) = x^2 + 2x - 15$. [5 marks]

i. Write the quadratic function in the standard form of $a(x-h)^2 + k$, where a, h and k are constants.

ii. Find the coordinates of the minimum or maximum point.

iii. Find the x and y-intercepts.

iv. Hence, sketch the graph of the function. Show clearly the vertex and all intercepts $f(x)$.

b) Find the quotient and remainder when $f(x) = x^3 - 2x^2 - 4$ is divided by $x + 2$ by using [5 marks]

i. long division.

ii. synthetic division.

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